



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

September 15, 1971

CENTER FOR DISEASE CONTROL  
ATLANTA, GEORGIA 30333  
TELEPHONE: (404) 616-0311

ORIGINAL  
(Red)

R. Rives Bailey, M.D.  
2761 Cook Road  
Yorktown, Virginia 23490

Dear Dr. Bailey:

Here are copies of the two memos which Bruce Evatt put together last year concerning the Lesser Grafton cases. Would I be right in assuming that no cases were diagnosed in the area during 1970 and that the only new cases beyond those included in the memo are the man with CLL and his son with HD whom you referred to on the phone?

I still see no practical way to investigate this further, though if you do encounter another case or two from the area it might be worth getting sera from as many people in the affected families (1966 on) and attempt to look for immunologic interactions between such sera and tumor cells from one or another of the surviving patients.

Thank you for calling today. We are still interested in the situation and appreciate your keeping us informed.

Sincerely yours,

Clark W. Heath, Jr., M.D.  
Chief, Leukemia Section  
Epidemiology Program

2 Enclosures

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Date: July 22, 1970

Reply to  
Attn of:

Subject: Leukemia and lymphoma in Lesser Grafton, Virginia, 1965-1969

To: The Record

In late April 1970, Dr. Bruce Evatt assisted in a preliminary epidemiologic investigation of an apparently increased incidence of lymphoma in Lesser Grafton, Virginia. The situation was first brought to attention by Dr. R. Rives Bailey of Yorktown. Dr. Bailey contacted Dr. Allan Peters, EIS Officer in Richmond, and Dr. Peters enlisted CDC assistance for the investigation. Dr. Bailey had noticed an increase in cases of lymphoma during the past 3 years in the Lesser Grafton area. He and Dr. Fred Davis, Department of Pathology, Riverside Hospital, Newport News, reviewed hospital charts on these patients to confirm their impression of an increased incidence.

Background

Lesser Grafton is a subdivision of the township of Grafton, Virginia. It is composed of three peninsulas, Grafton, Dare, and Seaford, which protrude into the west side of the Chesapeake Bay immediately south of Yorktown and east of Newport News. The population of Grafton Township was estimated to be 11,800 as of January 30, 1969, and of the Lesser Grafton area about 7,000. In general, the three peninsulas are sparsely populated and most of the inhabitants live either on or within a short distance of the Chesapeake Bay shore. Although residents of the three peninsulas are generally acquainted with each other, they are not known to belong to any common social group. One high school (York High) and four grade schools (Dare Elementary, Grafton-Bethel Elementary, Seaford Elementary, and Tabb Intermediate) serve the area. The three peninsulas contain two churches.

The area is (or has been) rich in crabs, oysters, and clams. An American Oil refinery is located on the York River immediately north of the three peninsulas. There is a U.S. Air Force bombing range across the Poquoson River south of the area. No other industry is located in the immediate area. Local water supply has been from deep wells (150 feet deep) on the peninsulas, but Grafton and Dare have obtained their water supply from Newport News within the past 2 years. Seaford is now gaining access to Newport News water. Sewage disposal in the area is primarily via septic tanks.

Cases

Medical records were reviewed for all cases of leukemia or lymphoma admitted to Riverside Hospital during the years 1965-1969. A total of

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11 cases diagnosed in this 5-year time period were found among residents of the Lesser Grafton area (Table 1). These included 5 cases of lymphosarcoma, 3 of Hodgkin's disease, 1 of multiple myeloma, 1 of chronic lymphatic leukemia, and 1 of acute blastic leukemia (Table 2). Report of another case of alleged multiple myeloma was not confirmed by chart review. All cases involved adults, 8 of the 11 being over age 45. Cases have occurred in a fairly uniform pattern since 1966. No cases occurred in 1965 or in the early part of 1966 (Figure 1).

Six of the 11 patients lived directly on the shore (Figure 2). One of the three patients on the Seaford Peninsula (Case 3) lived next door to a person who developed an intestinal leiomyosarcoma about the same time. Also in the same time period and in the same block, a granddaughter of Case 3 was born with a cleft palate. On the tip of this same peninsula a person living near Case #5 developed inguinal adenopathy in January 1970. Biopsy thus far, however, has revealed only reactive hyperplasia. Six cases occurred on the Dare peninsula and two in Grafton.

(See Ser. 1)

#### Expected Incidence

A comparison of observed and expected incidence of leukemia and lymphoma in three age groups is shown in Table 2. Only for lymphoma cases in the over-45 age group does the observed incidence significantly exceed expected for the 5-year period.

#### Further Investigation

In the course of the inquiry mention was made of diseases that have recently decimated the shellfish population along this particular coastline of Chesapeake Bay. Further information was obtained about these diseases from the Virginia Institute of Marine Science, located across the York River on Gloucester Point, Virginia. The details of information provided by the Institute have been recorded in a separate memorandum. In essence they tell of both a fungal and a parasitic disease which since about 1958 have affected shellfish beds along the mouths of the York and the James Rivers and have essentially eliminated the commercial fisheries there. Since the patients in Lesser Grafton live mostly along the shore and, like most people in that area, consume a fair amount of shellfish directly from their shore frontage, the possibility of a connection between the oyster diseases and human lymphomas was suggested. This seems unlikely, however, since fresh shellfish consumption is common all along the coast and there is no suggestion that leukemia or lymphoma incidence is increased elsewhere than in Lesser Grafton. (Dr. Bailey sees patients from areas other than Lesser Grafton.)

Dr. Bailey will contact CDC should further cases appear or should the patient with undiagnosed adenopathy develop lymphoma. Should further

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cases occur it might be worthwhile to pursue the investigation further (interview all patients or their families, collect serum specimens, and get tissue material for immunologic and tissue culture studies). On the basis of current information, however, the lack of any clear association among cases, despite the increase in incidence, makes it seem unprofitable to pursue more detailed studies at present.

*Clark W. Heath, Jr.*

Clark W. Heath, Jr., M.D.  
Chief, Leukemia Section  
Epidemiology Program

Bruce L. Evatt, M.D.  
Leukemia Section  
Epidemiology Program

cc:  
Dr. Peters  
Dr. Bailey  
Dr. Evatt

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Table 1. Cases of leukemia and lymphoma diagnosed since January 1, 1965  
in residents of Lesser Grafton, Virginia

Case No.	Initials	Age at diag. race, sex	Month and year of				Area of residence
			Onset	Diagnosis	Death	Diagnosis*	
1	R.H.	60 WM	6/66	12/66	4/67	HD	Seaford
2	A.G.	47 WF	2/64	12/66	9/68	LS	Dare
3	W.H.	40 WM	10/65	4/67	2/69	CLL	Dare
4	C.W.	51 WM	11/67	12/67	-	MM	Dare
5	D.H.	27 WM	1/68	3/68	-	HD	Seaford
6	E.M.	51 WF	2/68	3/68	-	LS	Seaford
7	J.C.	21 WM	4/68	8/68	-	LS	Dare
8	C.C.	70 WF	10/68	1/69	3/69	HD	Seaford
9	C.S.	74 WF	1/69	2/69	-	LS	Grafton
10	L.B.	52 WF	5/69	5/69	-	LS	Dare
11	W.C.	47 WM	5/69	5/69	-	AL	Dare

\* HD = Hodgkin's disease  
LS = lymphosarcoma  
CLL = chronic lymphocytic leukemia  
MM = multiple myeloma  
AL = acute leukemia

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Table 2. Observed and expected\* incidence of leukemia and lymphoma,  
Lesser Grafton, Virginia, 1965-1969

Age group	Estimated 1969 pop'l.	Number of leukemia cases			Number of lymphoma cases		
		Exp.	Obs.	P	Exp.	Obs.	P
0-14	2,289	0.6	0	-	0.1	0	-
15-44	3,206	0.4	1	0.3	0.9	2	0.2
45+	1,498	1.5	1	0.8	1.7	7	0.002
Total	6,993	2.4	2	0.7	2.7	9	0.002

\* Derived from incidence data for leukemia and lymphoma in Connecticut,  
1964. (Connecticut Tumor Registry)

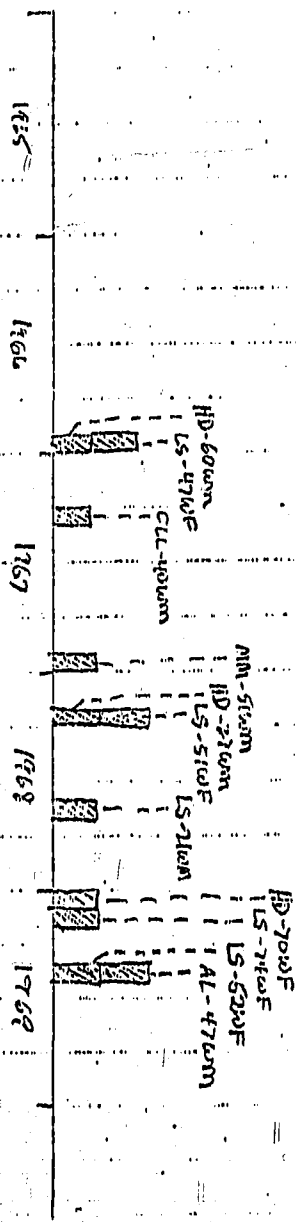
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*Glenn J. Lawrence and Benjamin Arroy  
residents of Leeser Anglen, Virginia.  
By month & station, 1965-1969*

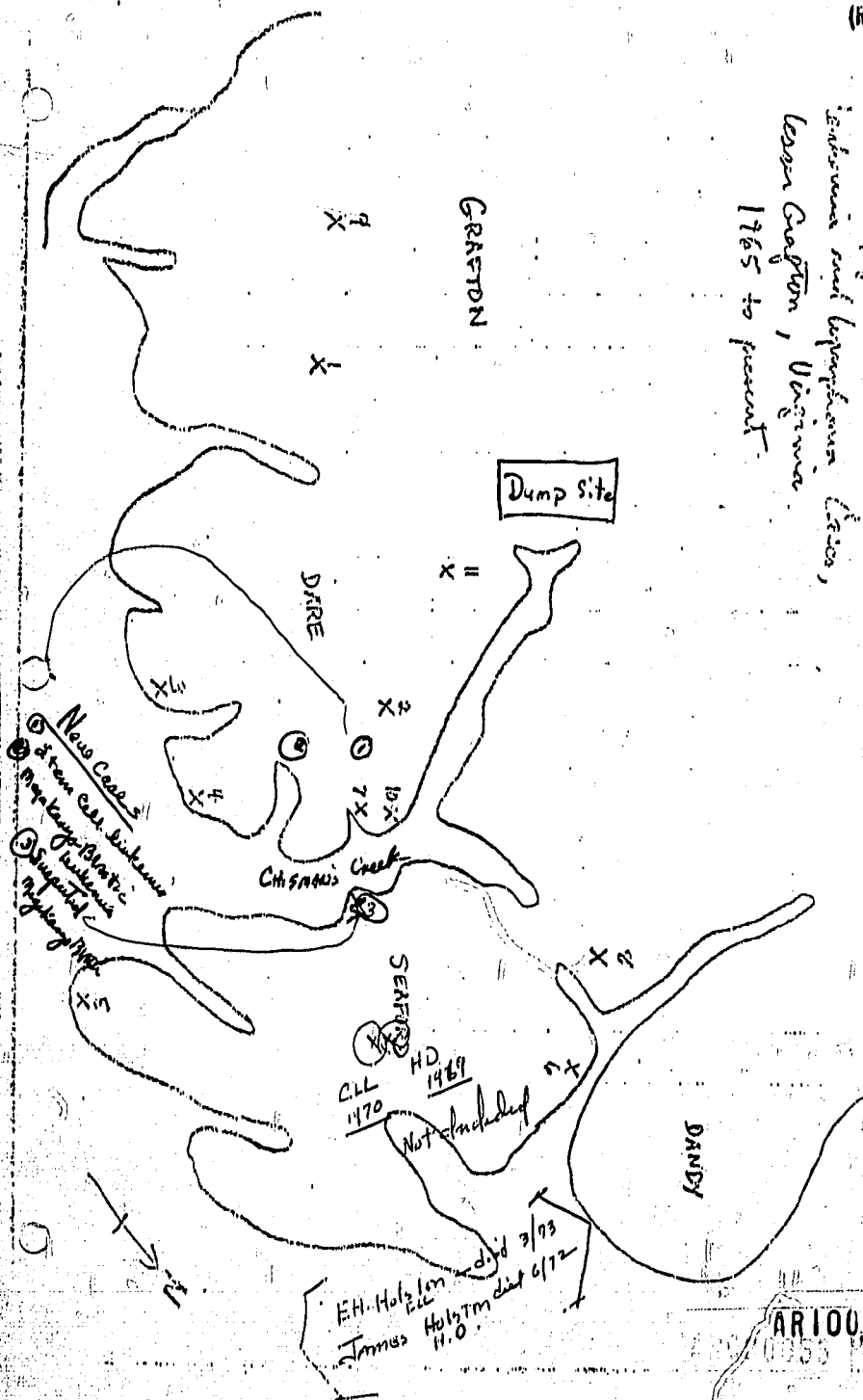
Figure 1.



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Figure 2  
Sinks and banyan trees,  
Lebanon, Virginia  
1765 to present



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ORIGINAL  
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Date: June 17, 1970  
Reply to  
Attn of:  
Subject: Lymphoma and leukemia in Lesser Grafton, Virginia  
Oyster disease in the same area  
To: THE RECORD

1. Since the distribution of cases appeared to be located immediately adjacent to the water along the mouth of York River, Dr. Frank Perkins, Virginia Institute of Marine Science, Gloucester Point, Virginia, was contacted in order to determine whether unusual marine diseases had been observed in the area of the York River during the past several years.

2. Dr. Perkins has been studying an outbreak of an epizootic in oysters which began 11 years ago, resulting in a catastrophic die-off of the available oysters at the mouth of the York and James Rivers. This oyster disease is caused by *Micrhotinia nelsoni* (MSX). This sporozan was first seen in large plantings of oysters at the mouth of the York River in 1959, and by 1960, all public and private beds in the lower Chesapeake Bay area had experienced heavy losses of oysters. The disease is located primarily in water having moderate to high salinity (above 15 percent) and for practical purposes is located in the Mobjack Bay and Hampton Roads areas. (See map of Andrews and Wood article, Chesapeake Science IM 8, pp. 1-13, 1967.)

3. An interesting aspect about this particular oyster disease is the fact that the sporozan has dense cytoplasmic organelles which are described as electron dense, round or large oval bodies found in clusters peripherally located in the spores. Their size range is 100-200 millimicrons in diameter, which is, interestingly, the size range of C-type particles. The organelles so far have not been specifically identified but there is speculation that they may represent a virus residing within the sporozan.

4. Mr. Dexter S. Haven, Head, Department of Applied Biology, Virginia Institute of Marine Science, supplied charts containing locations of oyster diseased areas and remaining oyster beds in the area of the leukemia-lymphoma cases. Prior to the onset of MSX in 1960, over two-thirds of the bottoms of Black Creek, Chisman's Creek, and Poquoson River were commercial beds leased from the Virginia Resources Commission. About one-quarter of the leases were used for commercial production; the remainder of the grounds provided a wild crop which was harvested by local residents with the surplus going into commercial channels. This area yielded about one million bushels annually to commercial growers. After MSX developed, production ceased and presently the only oysters harvested in the area by one grower. These oysters are small and sold to a soup company. A few scattered concentrations exist and knowledgeable

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residents living on these peninsulas can still obtain a bushel or two for their own use. These local residents often collect these oysters by hand at low tide and only persons familiar with the water in the area would be able to obtain these. (See attached U.S. Coast Geodetic Survey Charts supplied by Mr. Haven.)

5. Another disease of oysters in approximately the same area has been responsible for numerous oyster deaths but not to the extent of MSX, which is dermocystidium marinum. This particular fungus also has a known adenovirus residing within the nuclei plasma.

6. Local residents eating oysters from this area would of course be exposed to these diseased oysters by both diseases. Residents living within the city of Newport News and Hampton Roads would be obtaining oysters from local markets which are imported from commercial beds in other areas and would not have access to local beds as would people living directly on water on the three peninsulas. Location of the oyster beds in the three peninsulas are definitely close proximity to the location of the cases of lymphoma. However, both are scattered enough along the shores that no definite conclusions can be drawn. To determine the potential relationship of the oyster diseases to the onset of the lymphomas and leukemias case data would have to be collected for the entire Mobjack Bay and Hampton Roads areas, where the oyster disease is prevalent. This may be indicated in the future, especially if good tissue material is obtained from new cases of lymphoma which occur in the area.

7. Present Plans: Dr. Bailey is to contact NCDC if more cases occur so that specimens may be obtained before treatment is instituted. If good samples of tissue culture are obtained it may be feasible to obtain case information of Mobjack Bay and the James River area. If this data should suggest that the oyster disease may have some relationship to the cases then a joint project with the Virginia Institute of Marine Science to attempt to determine any possible relationship should be considered.

Bruce L. Evatt, M.D.  
Leukemia Section, EP

BLEvatt:wb

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